

ARC320 AMD64 Technology: A Solution Platform for Today and Tomorrow

**Margaret Lewis
Software Strategy Manager
AMD**

IT Challenges

- Accelerate application performance
- Improve asset utilization
- Reduce computing complexity
- Minimize user disruption
- Control data center costs



Answering the Challenges

IT needs to provide users

with top application
efficiency
and performance today



While offering
tomorrow's 64-bit
computing solutions

With minimal disruption and cost!

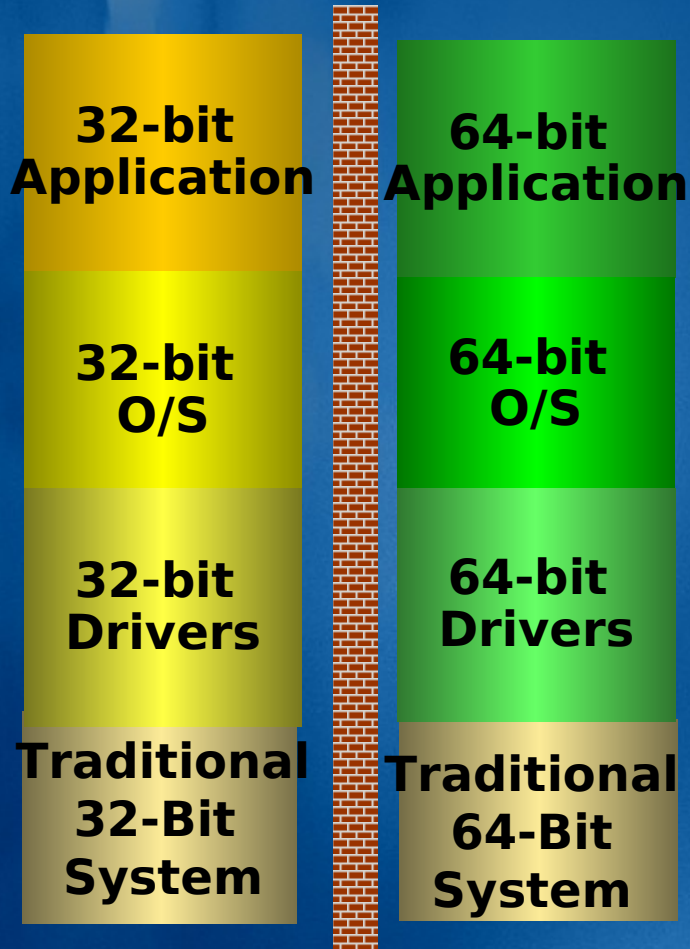
Why 64-bit Computing?

Efficiency and Performance!

- **Increased capacity** - larger amounts of data can be processed faster
- **Server consolidation** - larger workloads can be deployed on a single server
- **Performance** - complex calculations can be done in minutes

64-bit Computing

Traditional Approach

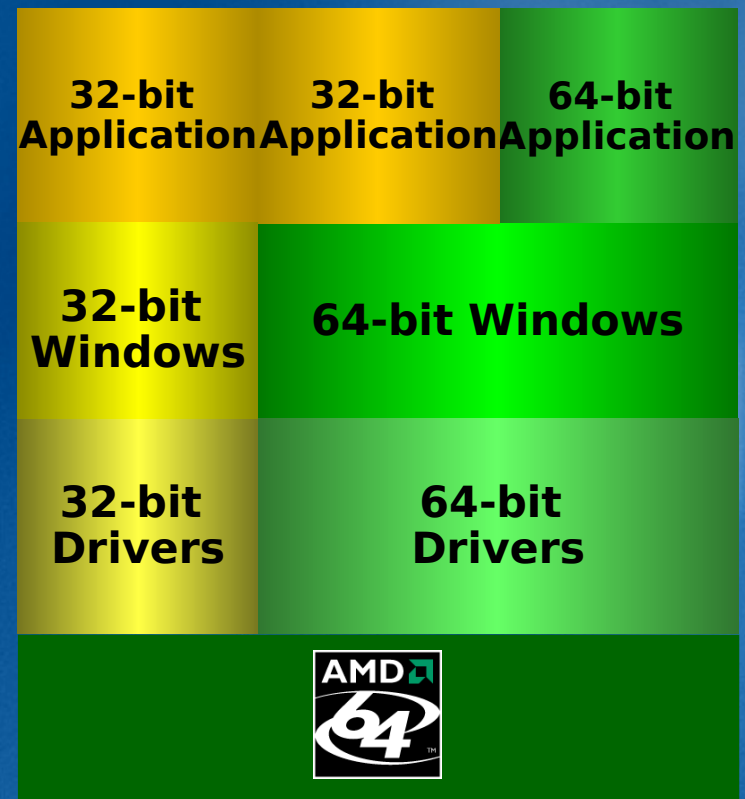


- Separate hardware infrastructure - cooling, power, enclosures, etc
- Separate software environments - licenses, deployment, tools, etc
- Users and administrators must know how to work in both environments

64-bit Computing

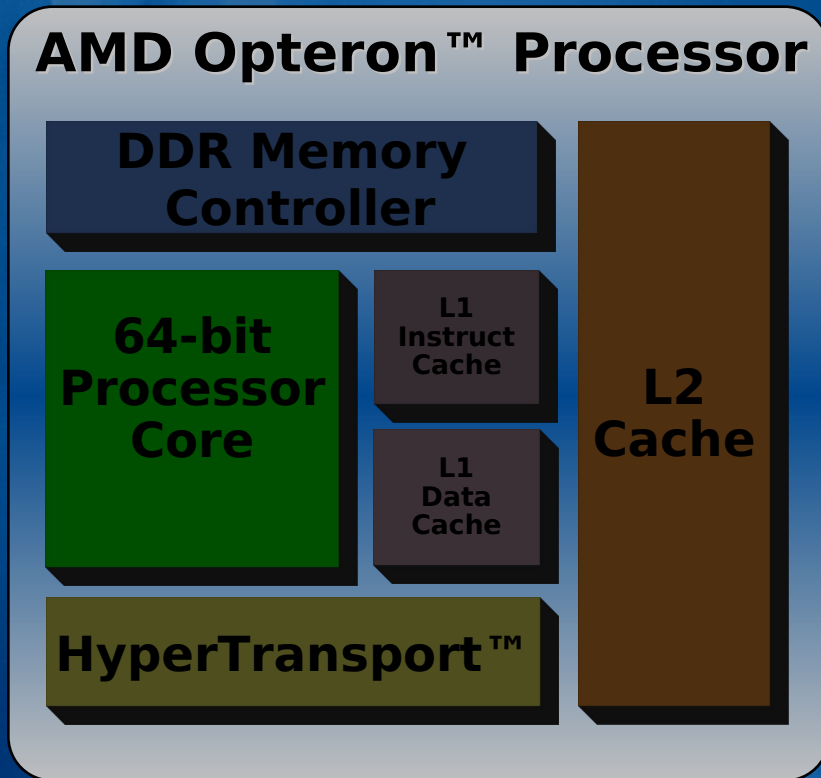
AMD's Approach

- Two new instructions added to extend x86 instruction set to support 64-bit addressing
- 32-bit x86 applications run without decreasing performance
- 64-bit applications are developed using familiar techniques and tools
- Users have a flexible migration path to 64-bit computing



64-bit Computing

AMD's Approach



- 64-bit processor core
- Integrated memory controller
- HyperTransport™ technology

AMD64 Technology

The x86-64 extensions of AMD64 are a continued evolution for the x86 market



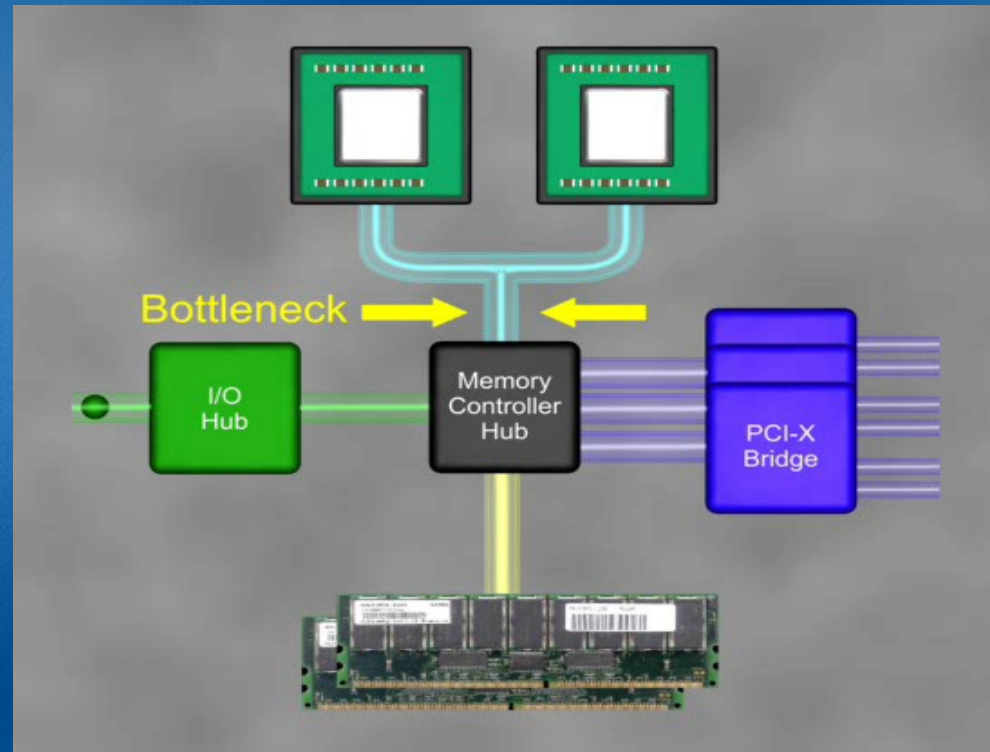
However, moving to 64-bit without easing the potential bottlenecks of the front side bus adds little value

System Architecture

Traditional Approach

Front Side Bus Architecture

**CPU's
access
memory
and I/O
hubs via
front side
bus**



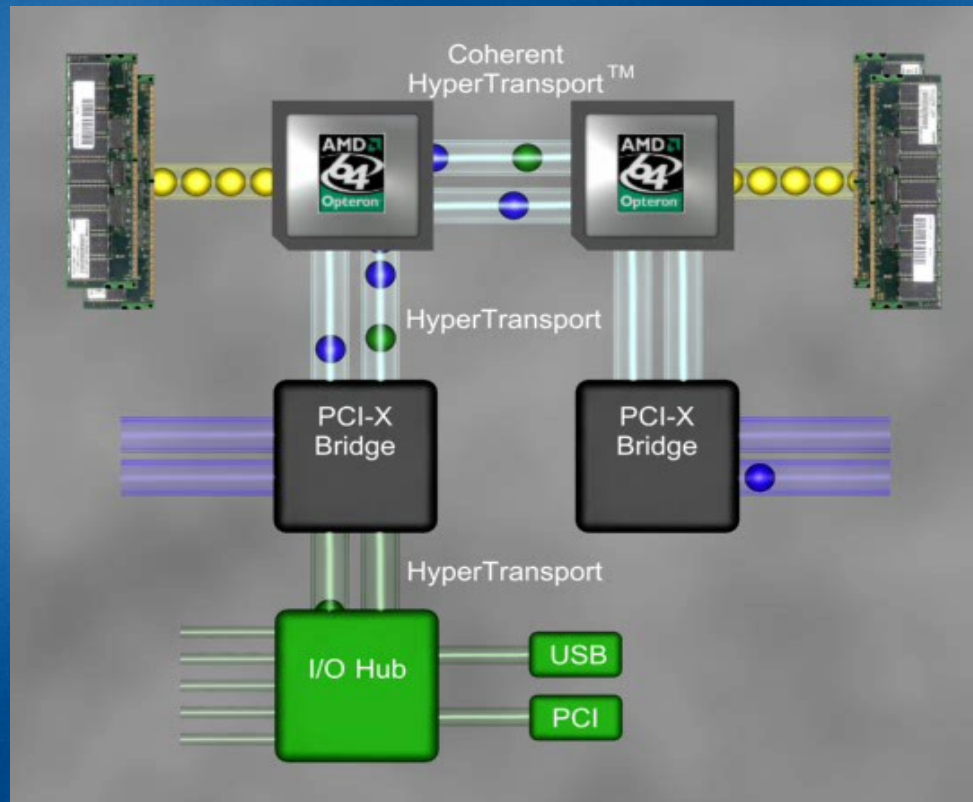
System Architecture

AMD's Approach

Direct Connect Architecture

Memory is
directed
connected
to the CPU

I/O is
directly
connected
to the CPU

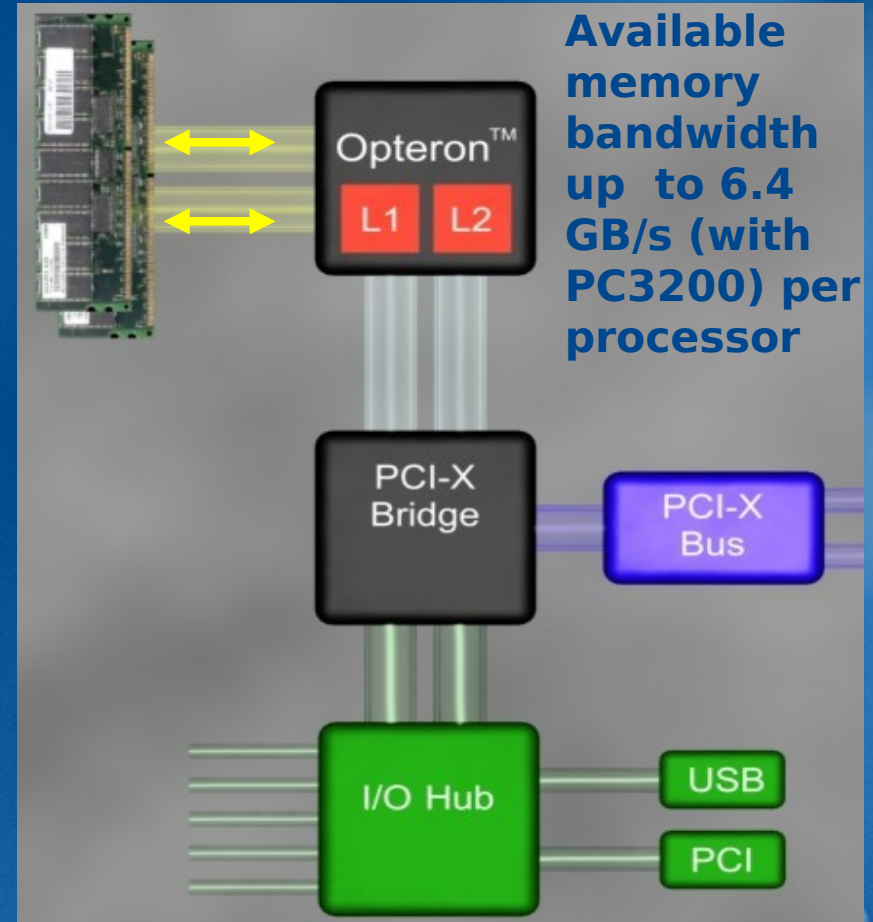


CPUs are
directly
connected
to CPUs

Direct Connect Architecture

Integrated Memory Controller

- Lower latency memory access provides faster data access
- Memory bandwidth scales with each CPU added
- Memory does not share bandwidth with I/O
- As the CPU frequency increases, memory controller becomes more



Direct Connect Architecture

HyperTransport™ Technology

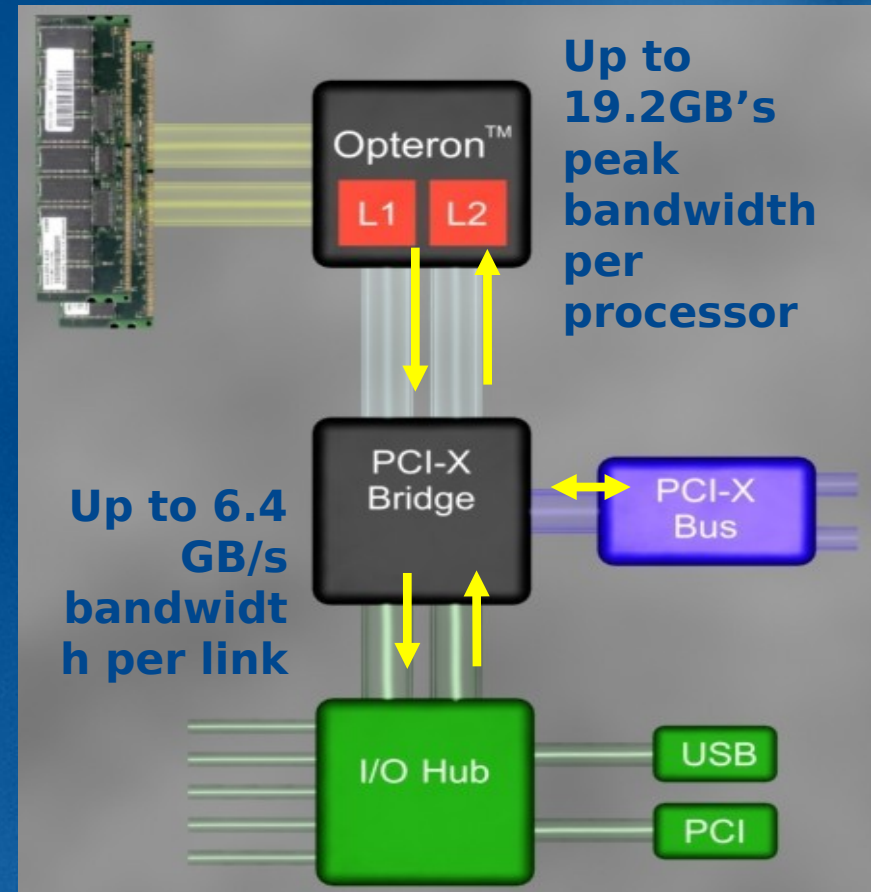
- High performance chip-to-chip interface
- Invented by AMD with contributions from industry partners
- Managed and licensed by the HyperTransport Technology Consortium



Direct Connect Architecture

HyperTransport™ Technology

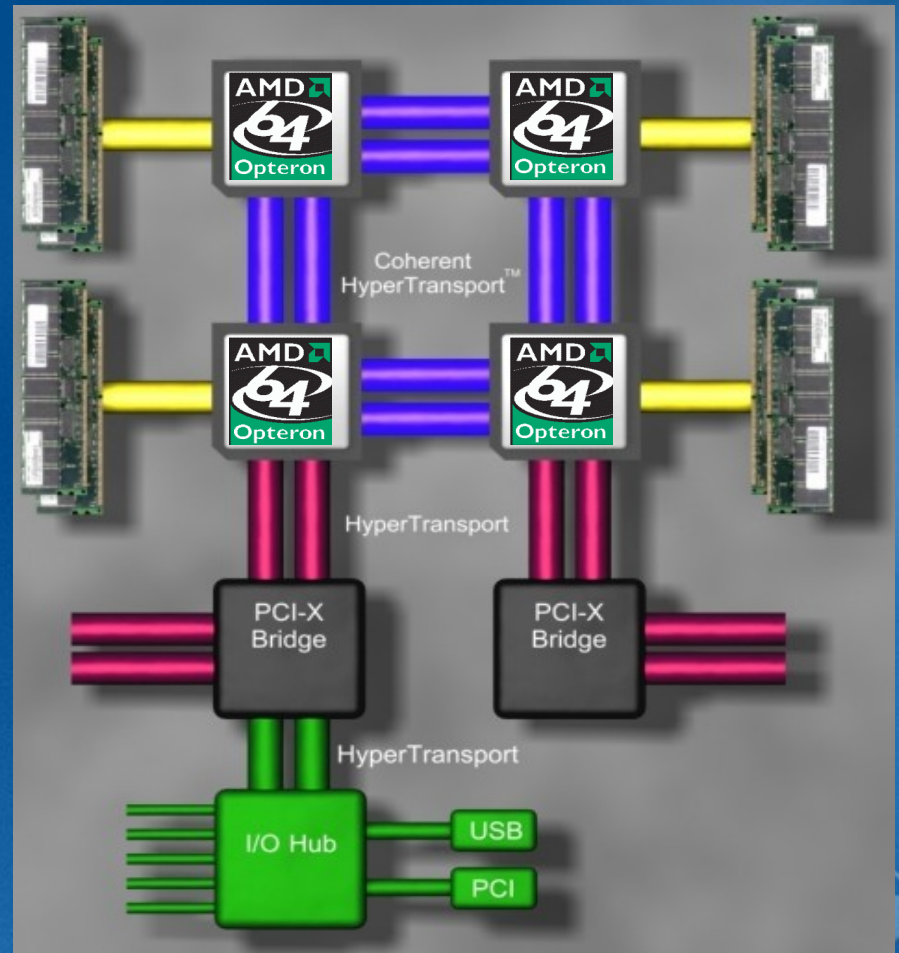
- Provides a scalable bandwidth interconnect between processors, I/O subsystems, and other chipsets
- Reduces I/O bottlenecks
- Supports new interconnects including PCI-X, DDR, InfiniBand, 10G Ethernet
- Reduces the number of proprietary buses



Direct Connect Architecture

HyperTransport™ Technology

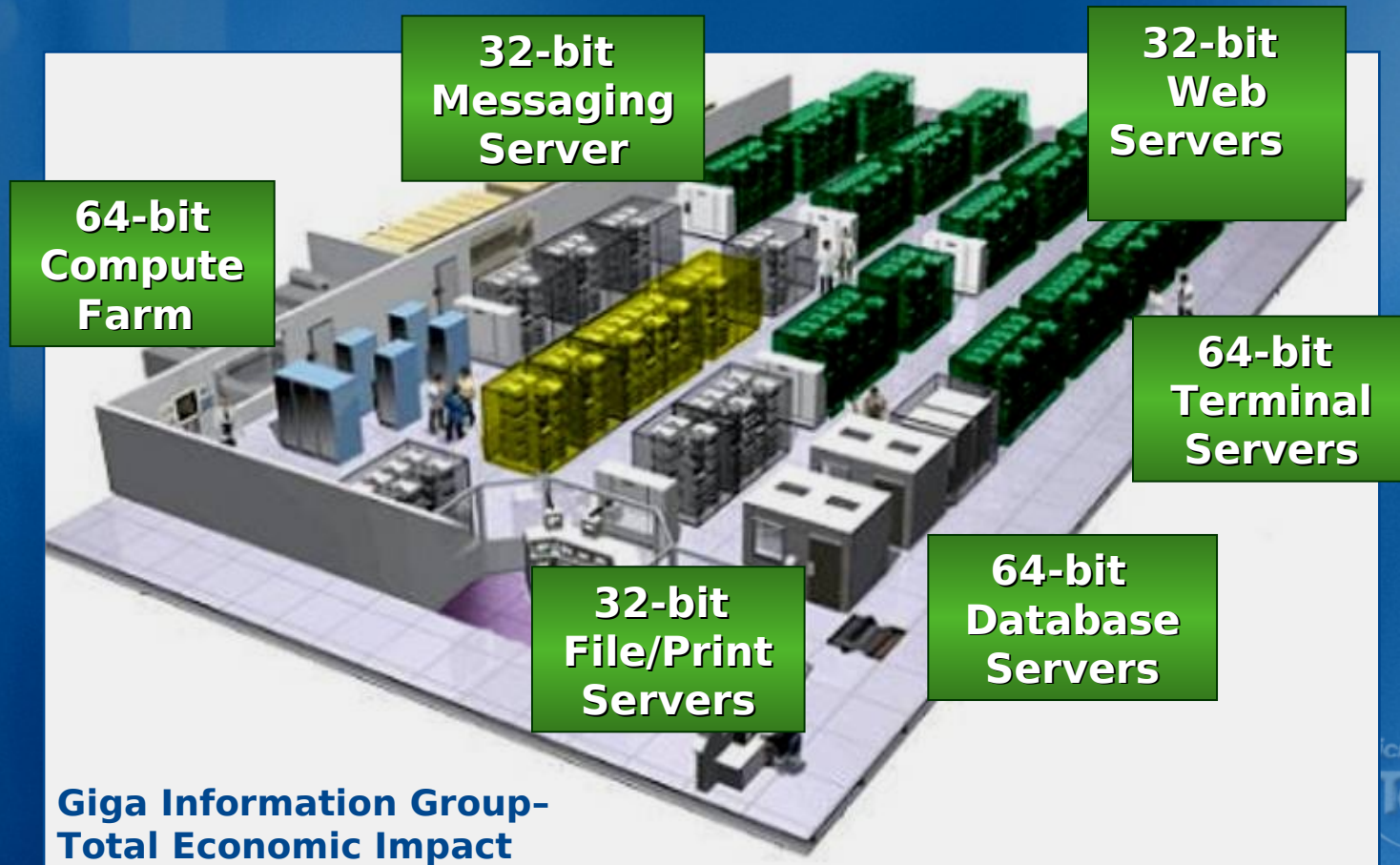
- Cache coherent mode enables glueless multiprocessing
- With Integrated Memory Controller enables scalable multiprocessing
- Low power consumption reduces a system's thermal budget
- Changes the economics of 4P computing



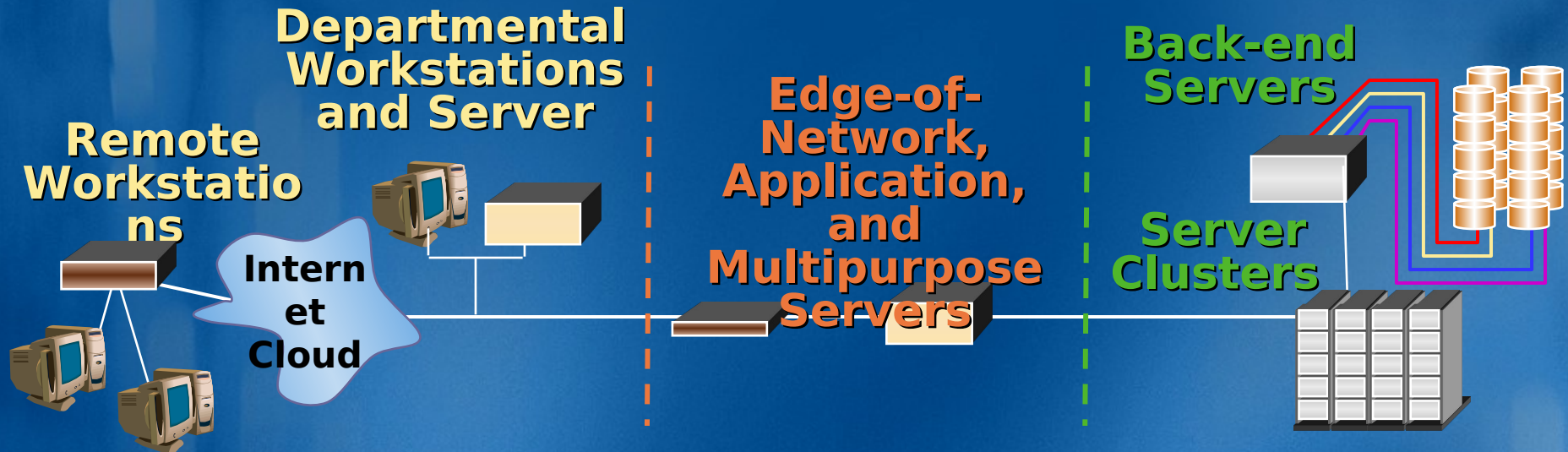
Unifying the Data

Center

“AMD Opteron™ processors can provide a single platform for the complex needs of the data center – reducing the costs by as much as 25 %.”



File and Print Servers



File and Print Servers

- File servers are used to store, retrieve, and share documents and programs within an organization
- Print servers manage the printing function in a networked environment
- Critical servers for user productivity

File and Print Servers

File and Print Servers need I/O more than MHz

AMD64 technology offers:

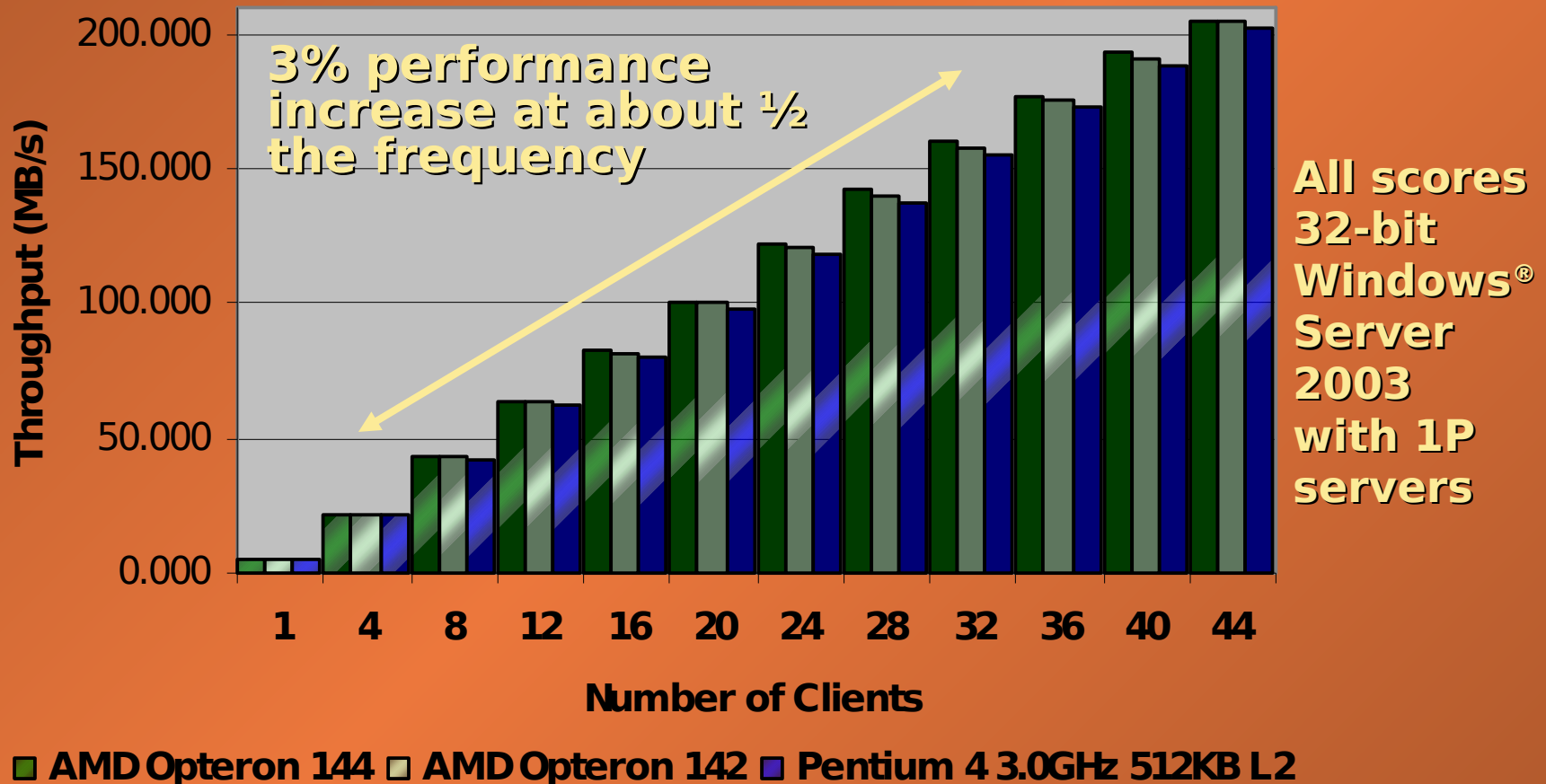
- Reduced memory latencies for cached data
- Lower frequency processor that outperforms competitive processors at almost twice the frequency

This translates into:

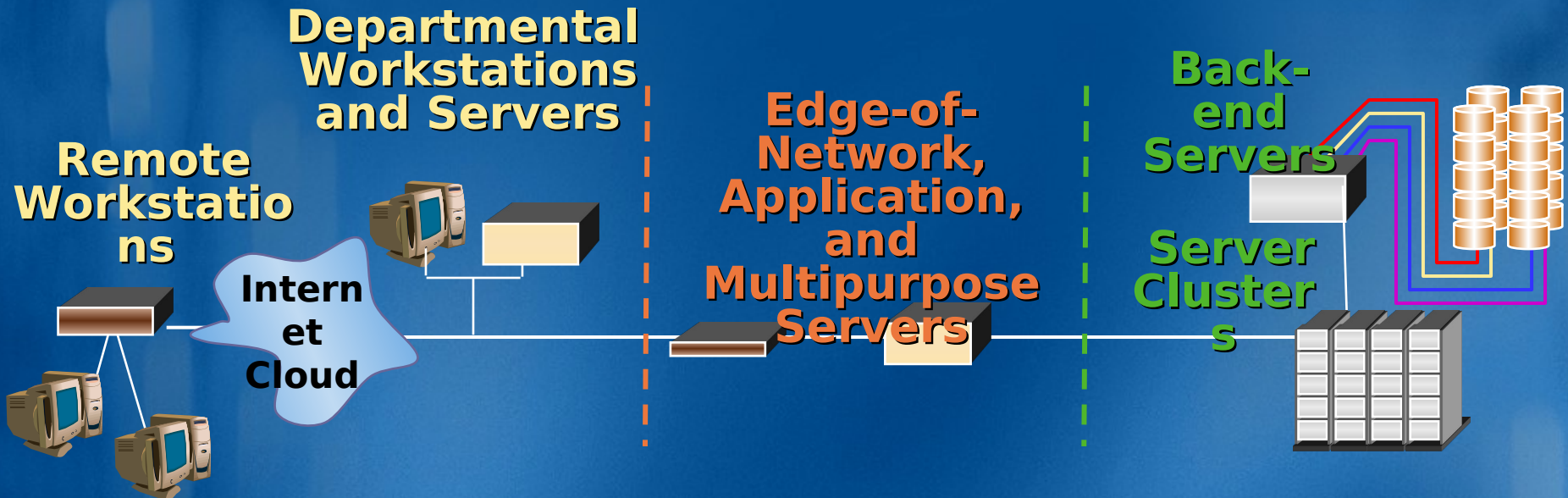
- AMD Opteron™ processors running Windows® Server 2003 can support more users at increased levels of throughput on a server with lower power consumption
- Server can scale as the business grows, sustaining performance even as the user load increases

File and Print Servers

NetBench Performance



Web Infrastructure



Web Servers

- Delivers static and dynamic web content for users to access via their Web Browser
- Mission critical server for eBusiness applications

Web Infrastructure

Web Servers demand superior I/O performance and memory response time

AMD64 technology offers:

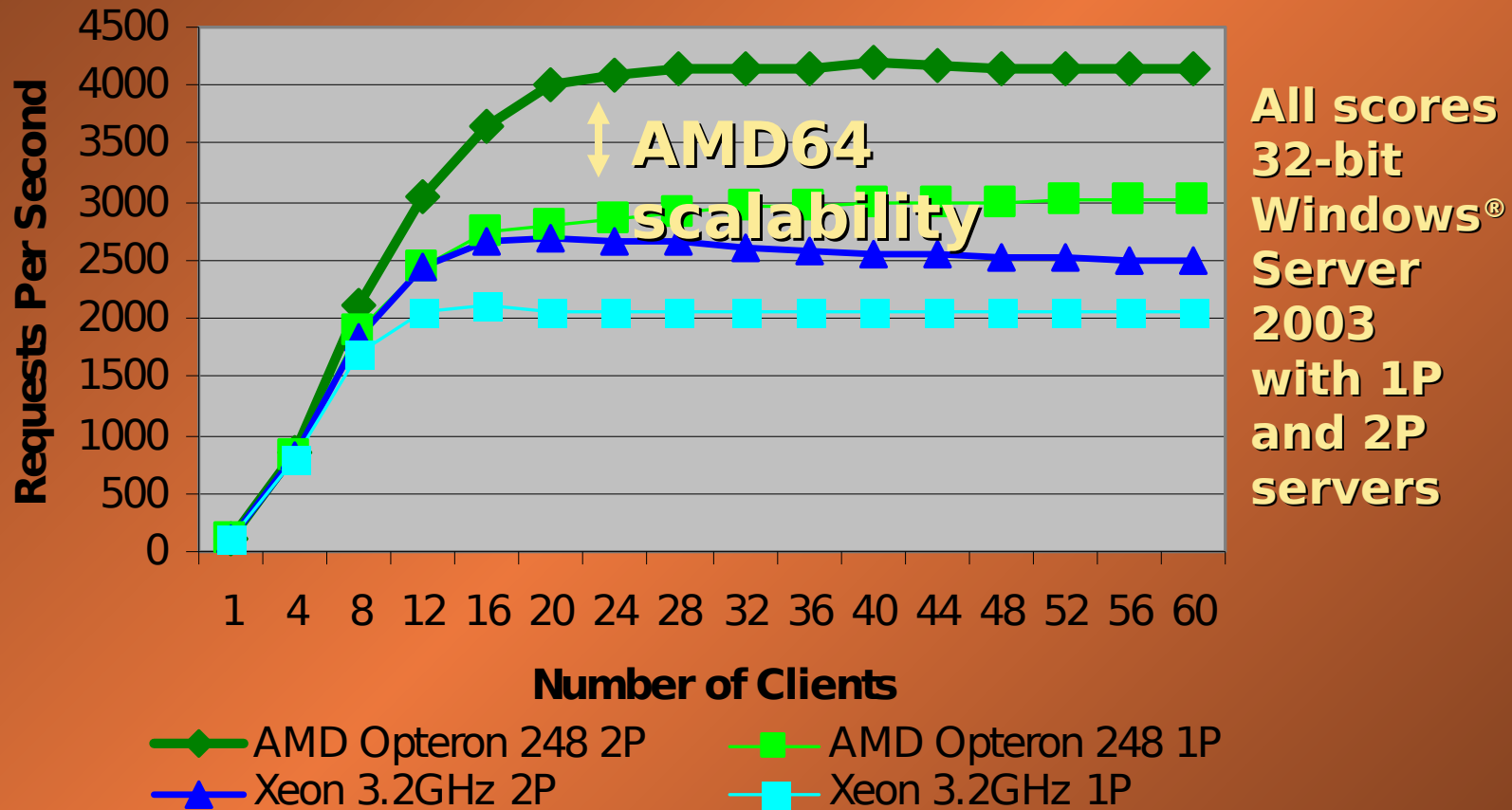
- Memory and I/O performance that increases the number of user connections while reducing response times

This translates into:

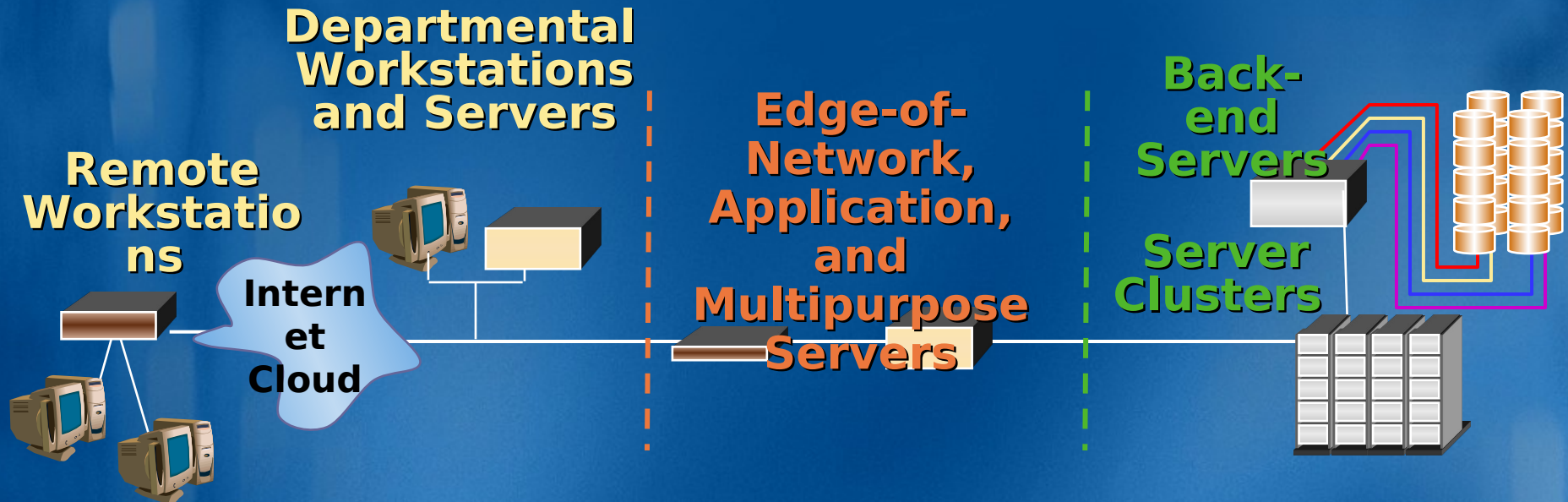
- 1P AMD Opteron™ processor-based server running Windows® Server 2003 is capable of supporting more users at increased levels of throughput than a comparable 2P x86 server
- Server can offer better scalability, sustaining performance as the user load increases

Web Infrastructure

WebBench 5.0 Performance



Database Servers



Back-end Database Servers

- Maintains data records, ensures user access, protects the data, and communicates with other servers and clients
- Mission critical server for resource planning and business processing

Database Servers

Database servers are memory and I/O intensive

AMD64 technology offer:

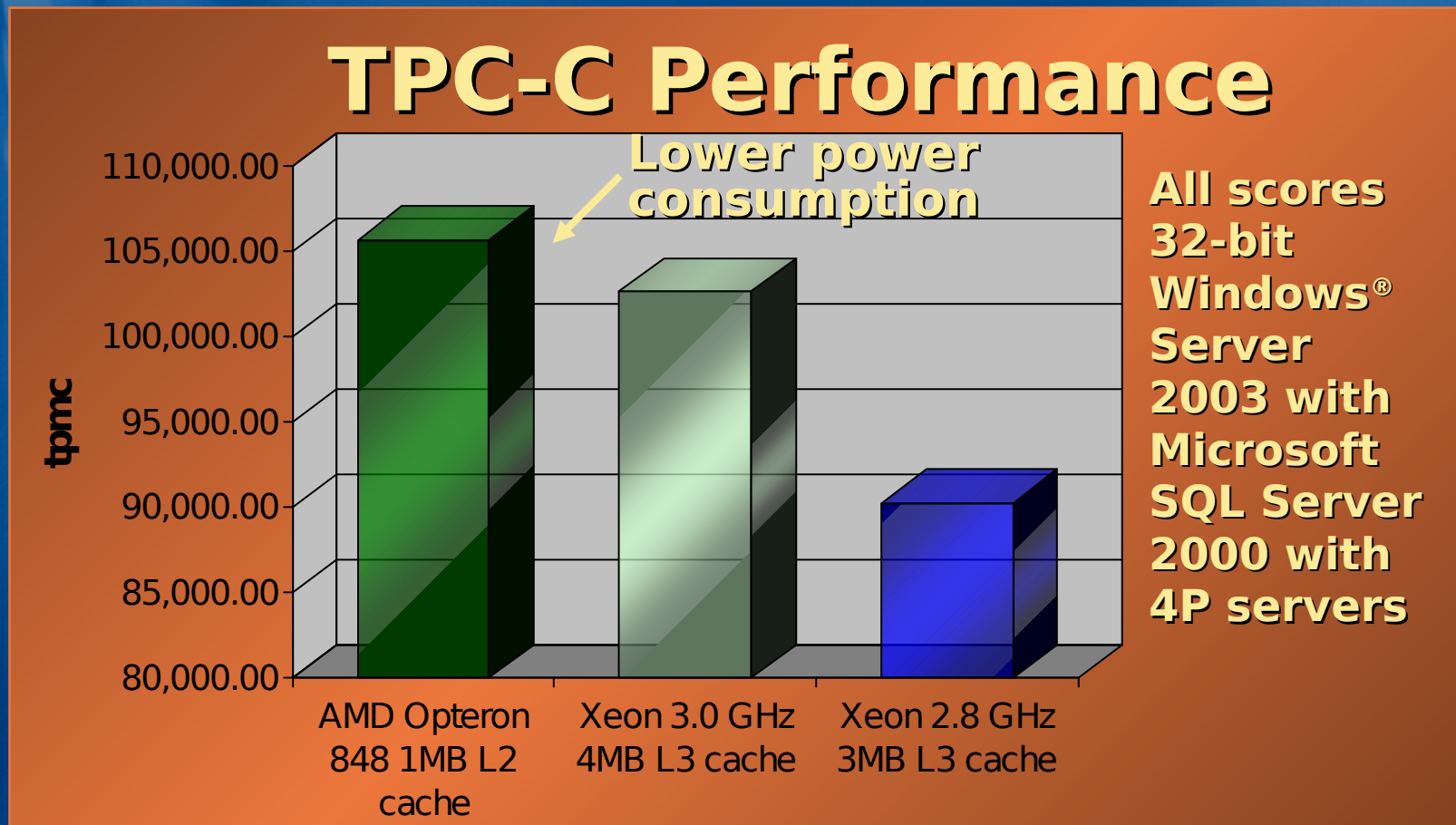
- Lower memory latency and balance and dedicated I/O with HyperTransport™ eliminates the bottlenecks found in traditional x86 systems

This translates into:

- 4P AMD Opteron™ processor-based server running Microsoft® SQL Server 2000 provides superior performance as measured with TPC-C and SAP SD benchmarks
- Provides a straightforward migration to 64-bit computing with same hardware infrastructure

Database Servers

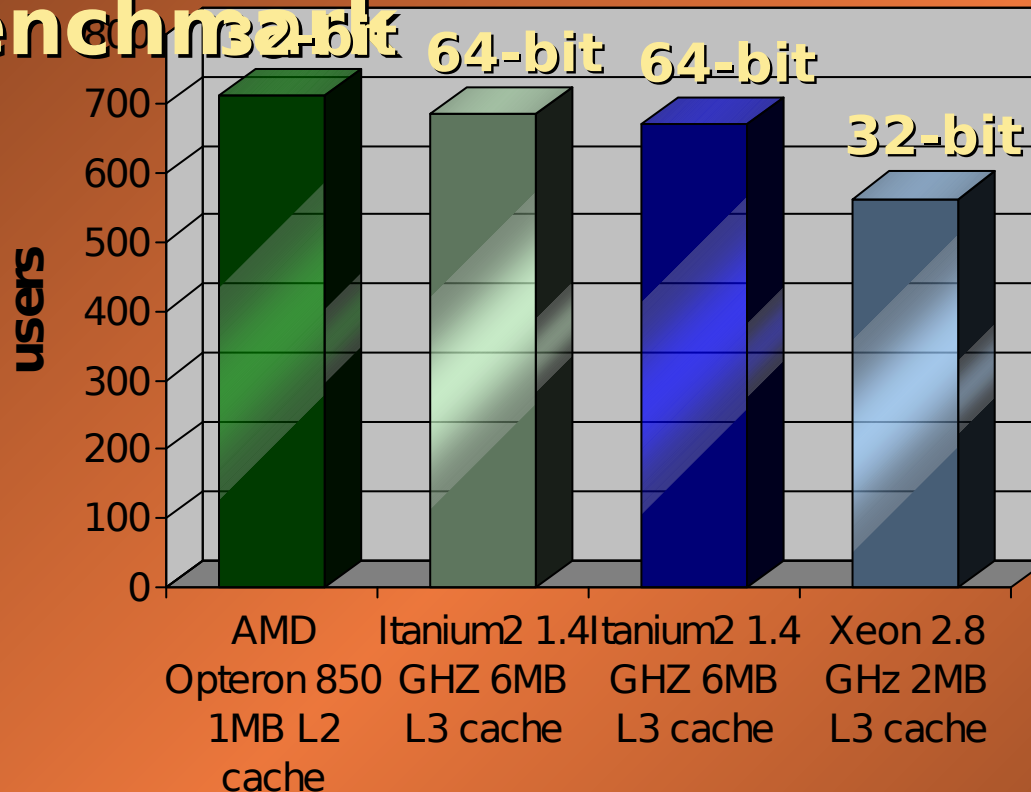
Online Transaction Processing



Database Servers

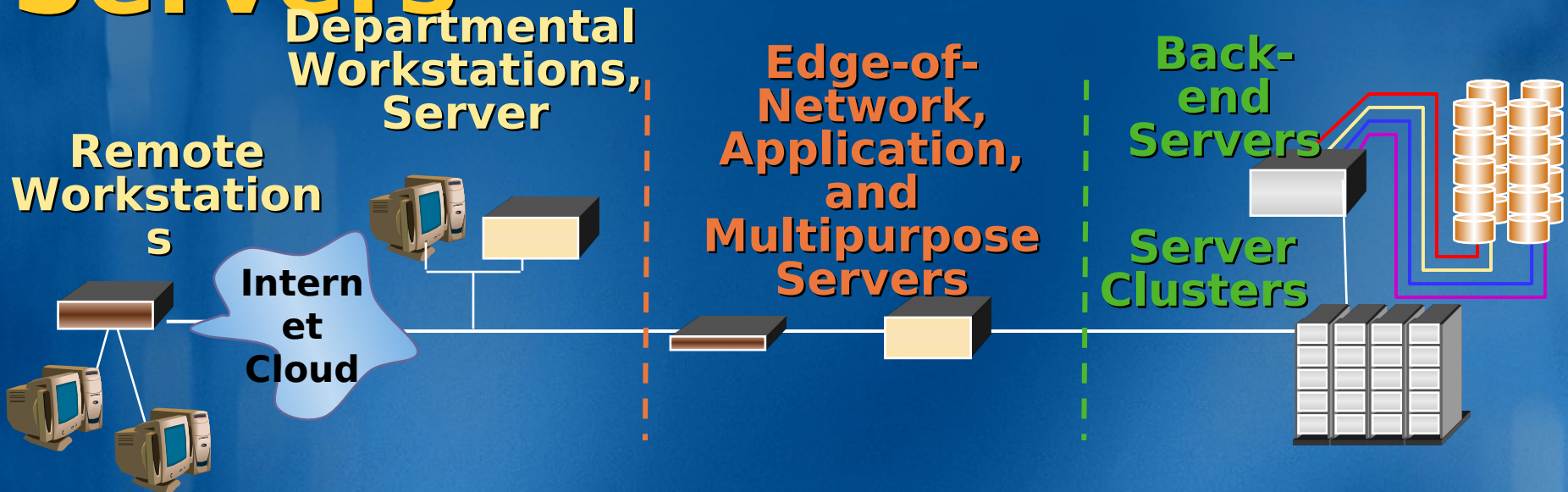
Business Processing

SAP SD Standard Application Benchmark



All scores
Windows®
Server
2003 with
Microsoft
SQL Server
2000 with
4P servers

Other Transactional Servers



Other Transactional Servers

- Messaging servers enable e-mail communication and is one of today's mostly widely used collaborative technology
- Terminal servers deliver mission critical applications to other computers

Other Transactional Servers

Email and terminal servers require low latency memory and fast I/O to service

user sessions
AMD64 technology:

- The Direct Connect Architecture, with fast, scalable memory eliminates the bottlenecks found in traditional x86 systems

This translates into:

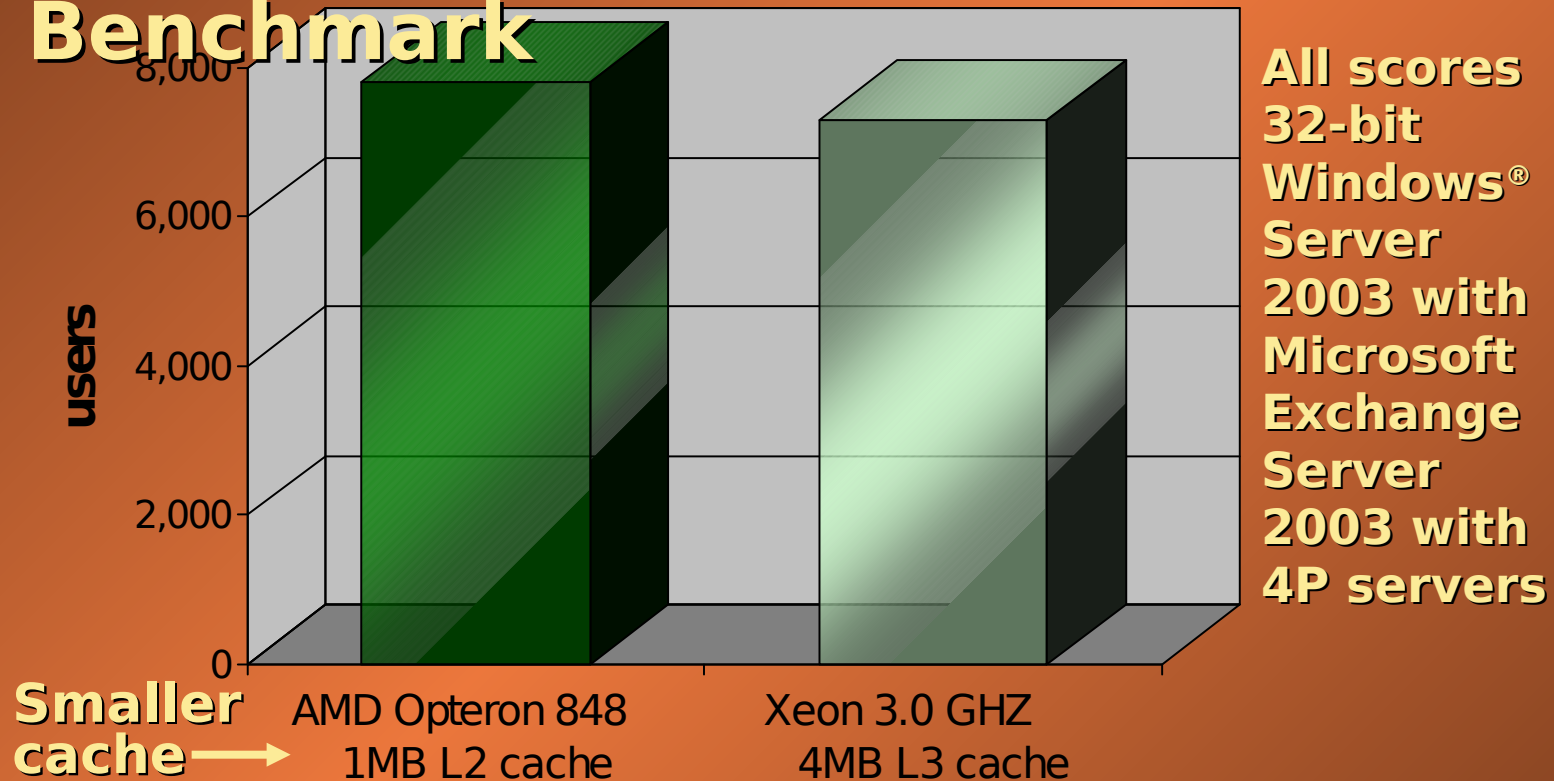
- Support for more users and/or more transactions with a more cost effective, lower powered server
- Server scales to support more user sessions and larger workloads

Other Transactional Servers

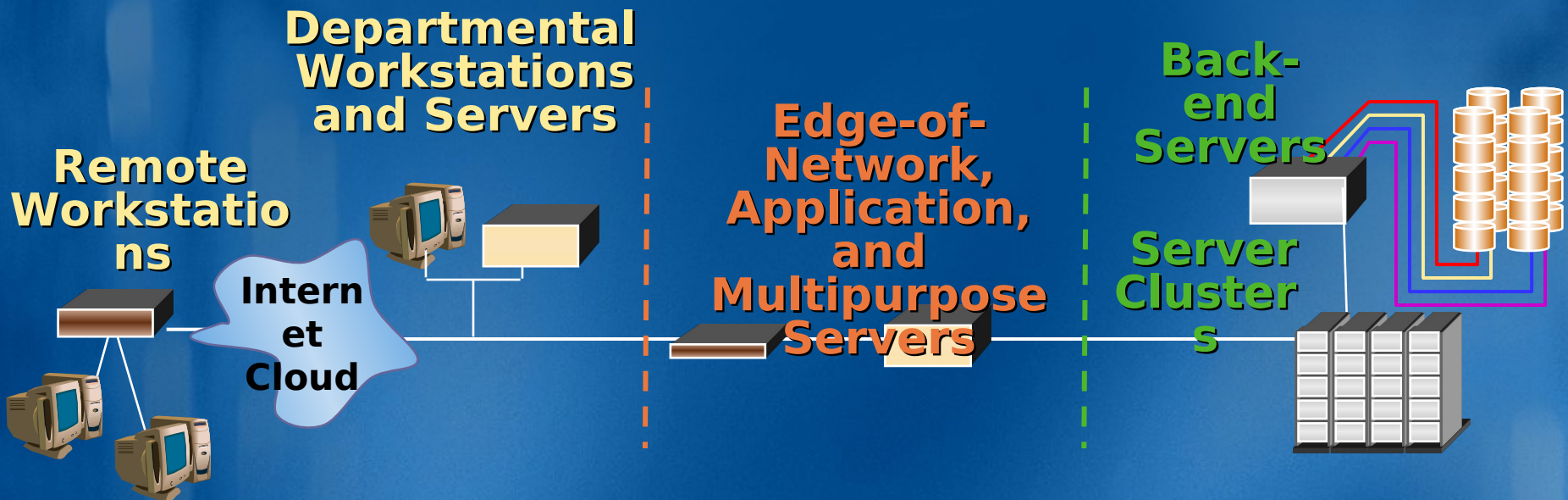
Messaging and Collaboration

Exchange Server 2003 MMB3

Benchmark



Workstations



Workstations

- Used by developers, designers, engineers, and scientist's to create software programs, digital content, and products and to visualize data

Workstations

Workstation need fast memory access, high-performance I/O, and mathematical processing

AMD64 technology offers:

- AMD64 delivers with its integrated memory controller and abundant floating-point resources

This translates into:

- Workstations running Windows XP® can handle large, complex files faster, reducing user wait time
- Competitive benchmark featuring AMD Opteron™ processor-based workstations located at AMD.com

http://www.amd.com/us-en/Processors/ProductInformation/0,,30_118_8826_8829~82385,00.html?redir=CPIW15

AMD64 Technology

Answering the Challenges

- Delivers top-end performance for today's 32-bit Windows®-based applications
- Provides the architecture to deliver the benefits of 64-bit Windows®
- Customer-centric approach that preserve hardware, software, and staff investments



AMD64 Technology

Public Information on AMD.COM

AMD Opteron™ processor info is available at:

http://www.amd.com/us-en/Processors/ProductInformation/0,,30_118_8825,00.html

AMD64 Ecosystem Presentation is available at:

www.amd.com/amd64ecosystem

AM64 Device Driver Information is available at:

http://www.amd.com/us-en/Processors/DevelopWithAMD/0,,30_2252_875_10454,00.html

AM64 Developer Information is available at:

http://www.amd.com/us-en/Processors/DevelopWithAMD/0,,30_2252,00.html



Microsoft[®]

Your potential. Our passion.[™]

© 2004 Microsoft Corporation. All rights reserved.

This presentation is for informational purposes only. Microsoft makes no warranties, express or implied, in this summary.

